

(19) World Intellectual Property  
Organization  
International Bureau



(43) International Publication Date  
6 May 2004 (06.05.2004)

PCT

(10) International Publication Number  
**WO 2004/037754 A3**

- (51) International Patent Classification<sup>7</sup>: C07C 7/12, 7/13, 11/02, 57/02, 69/533
- (21) International Application Number: PCT/US2003/030632
- (22) International Filing Date: 26 September 2003 (26.09.2003)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data: 60/421,355 24 October 2002 (24.10.2002) US
- (71) Applicant (*for all designated States except US*): DOW GLOBAL TECHNOLOGIES INC. [US/US]; Washington Street, 1790 Building, Midland, MI 48674 (US).
- (72) Inventors; and
- (75) Inventors/Applicants (*for US only*): BURDETT, Kenneth, A. [US/US]; 2101 Springwood Drive, Midland, MI 48640 (US). MAUGHON, Bob, R. [US/US]; 601 Est Main Street, Midland, MI 48640 (US). AU-YEUNG, Patrick, H. [CN/US]; 4625 Springbrook Court, Midland, MI 48642 (US).
- (74) Agent: ZUCKERMAN, Marie, F.; The Dow Chemical Company, Intellectual Property Section, P.O. Box 1967, Midland, MI 48674-1967 (US).
- (81) Designated States (*national*): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, YU, ZA, ZM, ZW.
- (84) Designated States (*regional*): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PT, RO, SE, SI, SK, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).
- Published:  
— with international search report
- (88) Date of publication of the international search report: 14 October 2004
- For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

(54) Title: STABILIZATION OF OLEFIN METATHESIS PRODUCT MIXTURES

(57) Abstract: A process of stabilizing an olefin metathesis product mixture, preferably, against double bond isomerization and thermal and chemical degradation. The process involves (a) contacting an olefin metathesis product mixture comprising one or more olefins produced in a metathesis process, a metathesis catalyst comprising a catalytic metal and one or more ligands, optionally, one or more metathesis catalyst degradation products, and optionally, one or more metals derived from sources other than the catalyst or catalyst degradation product(s), with an adsorbent, more preferably carbon; or alternatively, (b) subjecting the olefin metathesis product mixture to a two-step distillation, preferably, including short path wiped-film evaporation. A stabilized olefin metathesis product mixture is disclosed containing one or more olefins obtained in a metathesis process and having a total concentration of metal(s) of less than about 30 parts per million by weight.



WO 2004/037754 A3

# INTERNATIONAL SEARCH REPORT

International Application No.  
PCT/US 03/30632

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 C07C7/12 C07C7/13 C07C11/02 C07C57/02 C07C69/533

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 C07C

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the International search (name of data base and, where practical, search terms used)

EPO-Internal, PAJ, WPI Data

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PATENT ABSTRACTS OF JAPAN vol. 015, no. 221 (C-0838), 6 June 1991 (1991-06-06) & JP 03 066725 A (JAPAN SYNTHETIC RUBBER CO LTD), 22 March 1991 (1991-03-22) abstract	1-15, 20-30
X	US 5 539 060 A (TSUNOGAE YASUO ET AL) 23 July 1996 (1996-07-23) column 15, line 65 - column 16, line 7	1-15, 20-30
X	US 6 156 692 A (MARKS TOBIN J ET AL) 5 December 2000 (2000-12-05) cited in the application examples 2,6	1-15
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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

### \* Special categories of cited documents :

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

- "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- "Z" document member of the same patent family

Date of the actual completion of the international search

29 June 2004

Date of mailing of the international search report

19. 07. 2004

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Cooper, S

## INTERNATIONAL SEARCH REPORT

Int

Application No

T/US 03/30632

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	TETRAHEDRON LETTERS, vol. 40, 1999, pages 4137-4140, XP002272589 cited in the application page 4138; tables 1, ENTRY, 6	1-15
X	US 6 197 894 B1 (ASANUMA TADASHI ET AL) 6 March 2001 (2001-03-06) column 9, lines 6-18; examples 1-10	1-15
X	US 4 772 758 A (MANFRED KAUFHOLD) 20 September 1988 (1988-09-20)  example 1	1-11, 16-27, 31-34
A	DE 100 41 345 A1 (BASF AG) 7 March 2002 (2002-03-07)  example 1	1-11, 16-27, 31-34

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/US 03/30632

## Box I Observations where certain claims were found unsearchable (Continuation of Item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box II Observations where unity of invention is lacking (Continuation of Item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☒ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☒ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-11(partially),12-15,20(partially),21(partially),22-30

A process for stabilising an olefinic mixture produced by metathesis of olefins in the presence of a metallic metathesis catalyst in which the metals are removed by contact with an adsorbent (claims 1-11 partially,12-15,20 partially,21 partially and 28-30) and an olefin composition produced by such a process having a specified concentration of metals (claims 22-27).  
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2. claims: 1-11 (partially),16-19,20 (partially),21 (partially),31,32

A process for stabilising an olefinic mixture produced by metathesis of olefins in the presence of a metallic metathesis catalyst in which the metals are removed by distillation.  
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# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No.  
PCT/US 03/30632

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
JP 03066725	A	22-03-1991	NONE	
US 5539060	A	23-07-1996	JP 3277624 B2 JP 7041549 A JP 3259476 B2 JP 7102042 A	22-04-2002 10-02-1995 25-02-2002 18-04-1995
US 6156692	A	05-12-2000	CA 2225345 A1 DE 69713472 D1 DE 69713472 T2 EP 0841988 A1 ES 2179338 T3 JP 2000500700 T WO 9740934 A1 US 6159890 A	06-11-1997 25-07-2002 20-02-2003 20-05-1998 16-01-2003 25-01-2000 06-11-1997 12-12-2000
US 6197894	B1	06-03-2001	JP 11193323 A TW 411348 B	21-07-1999 11-11-2000
US 4772758	A	20-09-1988	DE 3612539 A1 DE 3760021 D1 EP 0241661 A1 JP 62242634 A	15-10-1987 19-01-1989 21-10-1987 23-10-1987
DE 10041345	A1	07-03-2002	AU 1495702 A WO 0216290 A2	04-03-2002 28-02-2002